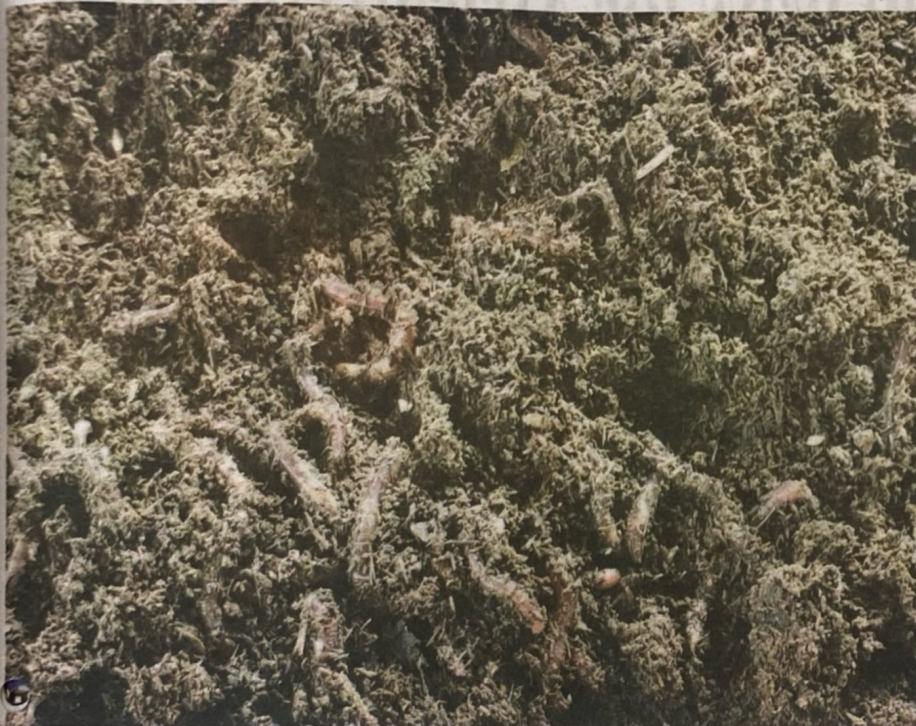




Various studies also report that earthworms are able to convert barren land into fertile land and increase the agriculture output. PHOTO/LOMINDA AFEDRARU

The importance of earthworms in sustainable agriculture

Earthworms are important because they have the capability to maintain the fertility of the soil and, therefore, play a key role in sustainability.

LOMINDA AFEDRARU

Sustainable agriculture refers to the production of food from plants or animals, using different agricultural techniques that protect communities, the environment and animal welfare.

The extensive use of chemical pesticides and fertilizers to boost crop yields may have resulted in good yields and pro-

ductivity but it has caused the efficiency of the soil to deteriorate throughout the world day by day. This modern agricultural practice has caused a steep fall in the biodiversity associated with cropland ecosystems.

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This is the contention of agricultural scientists who have

conducted research studies to ascertain their importance in sustainable agricultural systems.

Case studies

Robinah Munduru, a researcher associated with Makerere University – who has studied earthworm populations, specifically focusing on how soil physicochemical properties and land-use types affect their abundance – has emphasized the importance of earthworms as ecosystem engineers in agricultural soil management.

In her investigations, often linked to Makerere University's College of Agricultural and Environmental Sciences, Ms Munduru studied the

effect of soil physicochemical properties and land use types in banana, soybean, coffee, maize and fallow fields at Makerere University Agricultural Research Institute (MUARIK) Kabanyolo.

Earthworms were sampled from three randomly selected points within each land use type for determination of earthworm abundance from April – May 2023.

This was done by digging out soil blocks measuring 30cm by 30 cm where earthworms were hand sorted and abundance recorded. Soil samples were also collected for laboratory analysis.

The result indicated that highest earthworm population were found in banana

fields followed by fallow fields and lowest in soybean fields.

There was also a significant difference in the soil physicochemical properties across land with banana having the highest concentration of organic carbon, Nitrogen, Calcium due better soil management.

The population of earthworms increased with the level of organic carbon, phosphorous and inclusion of soybean use.

"The studies suggest that applying organic residues such as mulches and manure while minimizing soil disturbance is crucial for sustaining earthworm populations," she says.

In another study published in plantwise blog, Associate Professor Jaswinder Singh from the department of Zoology, Khalsa College Amnister in India notes that earthworms maintain the physico-chemical properties of the soil by converting biodegradable materials and organic wastes into nutrient-rich products, emerging from their burrows to deposit the fecal matter (vermicast) on the surface.

"Earthworms stimulate microbial activity, mix and aggregate the soil, soil water content and water holding capacity. The mutual action of earthworms and microbes brings faster decomposition as the earthworm's condition, aerate, fragment and enhance the surface area of the organic matter for microbial action. They also increase litter decomposition, soil organic matter dynamics, nutrient cycles, promote plant growth and reduce some soil-borne diseases," he notes.

He further goes on to explain that earthworm burrows act as a channel for plant growth and as pathways for root elongation, especially in compacted zones typically found in deeper soil layers.

"Earthworms makes the soil porous, increasing the water infiltration rate and reducing soil erosion. Some studies even report that earthworms release certain metabolites, such as vitamin B and vitamin D into the soil, which are good for growth of plants," he said.

Various studies also report that earthworms are able to convert barren land into fertile land and increase the agriculture output.

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IMPORTANCE OF EARTH-WORMS IN UGANDA'S FARMING SYSTEM

Just as the creatures are essential in any farming system in the world, experts say the same applies in farmer fields in Uganda.

Earthworms are essential for boosting soil fertility, improving structure and promoting sustainable, low-cost farming. This is because they act as natural engineers, creating tunnels for aeration and water infiltration and turn organic matter into nutrient-rich castings that increase crop yields, crucial for sustaining agriculture.

Key reasons earthworms are vital in Uganda

Soil Fertility and Nutrient Cycling: Earthworms decompose dead plant matter such as crop residues and convert it into worm castings (vermicompost), which are richer in nitrogen, phosphorus and potassium than surrounding soil.

Improved Soil Structure and Water Management: They create tunnels that allow for better aeration, preventing soil compaction and improving water infiltration which helps crops survive droughts.

Reduced Reliance on Chemical Fertilizers: By increasing natural nutrients in the soil, earthworms help smallholder farmers reduce the high cost of purchasing inorganic fertilizers.

Organic Waste Recycling: Earthworms consume waste materials, turning them into fertilizer, which is key for organic farming practices.

Increased Productivity: Earthworm activity improves root growth and plant resilience, leading to higher, healthier crop yields.

Encouraging earthworm populations through farming practices such as reducing tillage and applying organic waste is vital for long-term food security in Uganda. Also, scientists at MuARIK are breeding them as feed meal to provide protein for fish, poultry and animal feed.